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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,550	10/14/2005	Koji Tamai	038788.55987US	9222

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CROWELL & MORING LLP
INTELLECTUAL PROPERTY GROUP
P.O. BOX 14300
WASHINGTON, DC 20044-4300

EXAMINER	
KANE, JASON MARC	
ART UNIT	**PAPER NUMBER**
4122	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/526,550	TAMAI ET AL.	
	Examiner	Art Unit	
	JASON KANE	4122	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) *5-9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☒ Claim(s) *1-2* is/are objected to.

8)☒ Claim(s) *1-9* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/3/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-9 are pending as amended on 3 March 2005.

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-4, drawn to a method.

Group II, claim(s) claims 5-6, drawn to an article.

Group III, claim(s) 7-9, drawn to an apparatus.

2. The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The technical feature, in which applicants' regard as their special technical feature, present in all three groups is the method of claim 1. The examiner notes that the method of claim 1 is disclosed by Kajii et al. US Patent 6,412,309 further in view of Hiroshi et al. (Heat Transfer Using Impinging Air Jet with Under-Expansion", Nippon Kikai Gakkai Tohoku Shibu Chiho Koenkai Koen Ronbunshu, Vol. 2001, Page 111-112) and would have been obvious in the art at the time of the invention and as such, unity of invention is lacking.

Kajii et al. disclose a thermally tempered glass produced by allowing impact jet flow from quenching nozzles to blow against glass surfaces (abstract). The process is used to produce thin, curved, thermally tempered glass (Col. 10, lines 59-65) using the above jet flow and the reference discloses throughout that a quenching step is conducted by simultaneously using two types of quenching nozzles (37/27 and 79 in the figures) wherein it is illustrated that the nozzles have differing exit diameters (see figures).

Kajii et al. do not disclose that the impact jet flow is an underexpansion jet flow. However, Kajii et al. disclose throughout that during impact jet flow using the above nozzles, heat is being transferred from the glass sheet in order to quench the sheet (Col. 7, line 60 to Col. 8 line 5).

Hiroshi et al. disclose the use of nozzles with under-expansion jet flow as a way of enhancing the transfer of heat from a surface to an air jet (Abstract).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use nozzles with under-expansion jet flow as taught by Hiroshi et al. in Kajii et al.'s process with reasonable expectation that this would result in enhanced heat transfer from the glass surface.

3. During a telephone conversation with Joseph Evans on 12/21/2007 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-4. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5-9 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

The information disclosure statement filed on 3 March 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but some of the information referred to therein has not been considered.

Specification

5. The abstract of the disclosure is objected to because: it exceeds 150 words, the first sentence is unclear, the phrase “of the quenching nozzles” (line 8) is redundant, and the phrase “a exit” should read “an exit” (line 11). Correction is required. See MPEP § 608.01(b).

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

7. The disclosure is objected to because of the following informalities: unclear sentence (pg 1, lines 10-12), unclear sentence (pg 1 line 28 to pg 2 line 2), grammatically incorrect sentence (pg 2 lines 15-17) should read “a method where only the glass temperature is made higher is limited”, missing word “if” before “the exit” (pg 8 line 8), grammatically incorrect sentence (pg 10 lines 16,17) should read “The thinner the glass plate, the more difficult it is to quench uniformly".

Appropriate correction is required.

Claim Objections

8. Claim 1 is objected to because of the following informalities: the claim is not written in proper claim language and format. The first part of claim 1 which reads, “In case that a thermally tempered glass is produced by allowing an impact jet flow from quenching nozzles to blow against the glass” reads like a product by process claim, however, claims 2-4 refer back to claim 1 as a process claim. Examination will proceed assuming that claim 1 is a process claim. Appropriate correction is required.

9. Claim 2 is objected to because of the following informalities: the phrase “the quenching nozzle” lacks antecedent basis because claim 1 refers to “two types of quenching nozzles” where the nozzles have different exit diameters, and claim 2 refers only to "the quenching nozzle" and then provides a diameter range for that nozzle. It is unclear which type of nozzle is being limited. Examination will proceed assuming that the diameter range recited in claim 2 applies to both nozzles. Appropriate correction is required.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kajii et al. US Patent 6,412,309, in view of Hiroshi et al. (Heat Transfer Using Impinging Air Jet with Under-Expansion”, Nippon Kikai Gakkai Tohoku Shibu Chiho Koenkai Koen Ronbunshu, 2001, Page 111-112).

12. **Regarding claim 1,** Kajii et al. disclose a glass quenching apparatus for producing thermally tempered glass produced by allowing impact jet flow from quenching nozzles to blow against glass surfaces (Abstract). The process is used to produce thin, curved, thermally tempered glass (Col. 10, lines 59-65) using the above jet flow. The reference discloses throughout that a quenching step is conducted by

simultaneously using two types of quenching nozzles (37/27 and 78/79 in the Figures) wherein it is illustrated that the nozzles have differing exit diameters (see Figures).

Kajii et al. do not disclose that the impact jet flow is an underexpansion jet flow. However, Kajii et al. disclose throughout that during impact jet flow using the above nozzles, heat is being transferred from the glass sheet in order to quench the sheet (Col. 7, line 60 to Col. 8 line 5).

Hiroshi et al. disclose the use of nozzles with under-expansion jet flow as a way of enhancing the transfer of heat from a surface to an air jet (Abstract).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use nozzles with under-expansion jet flow as taught by Hiroshi et al. in Kajii et al.'s process. The rationale to do so is provided by Hiroshi et al.'s teaching that use of nozzles with underexpansion jet flow predictably results in enhancing the transfer of heat from a surface to an air jet (Abstract).

13. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajii et al. US Patent 6412309 in view of Hiroshi et al. (Heat Transfer Using Impinging Air Jet with Under-Expansion", Nippon Kikai Gakkai Tohoku Shibu Chiho Koenkai Koen Ronbunshu, 2001, Page 111-112) as applied to claim 1 above, and further in view of Nikander et al. US Patent 5,846,281 and Aratani et al. US Patent 4,735,646.

14. **Regarding claim 2,** Kajii et al. and Hiroshi et al. disclose all the limitations of claim 1 (see 12 above). Kajii et al. further discloses the outside diameter d of the second nozzle 78 as measured at the lower end 78b is in the range of 1.0 to 2.0 mm (Column 8 lines 28-32, Figure 6). Kajii et al. do not explicitly disclose the exit diameters

of nozzles 37/27, however, it can be concluded from Figures 5 & 12 that the diameter of nozzles 37/27 is approximately 1.5 to 2 times the diameter of second nozzles 79/78, making the diameter of nozzles 37/27 about 1.5 to 4 mm.

Kajii et al. do not explicitly disclose the distance between the quenching nozzles and the glass.

Nikander et al. disclose that in order to achieve good glass tempering results with moderate power consumption, it is important that the air jets impinging the glass are blown from nozzles about 20 mm from the glass (Column 1 lines 10-16).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a distance of about 20 mm from the nozzles to the glass as taught by Nikander et al. in Kajii et al.'s apparatus. The rationale to do so is provided by Nikander et al.'s teaching that use of air jets impinging the glass blown from nozzles that are about 20 mm away from the glass predictably results in good glass tempering results with moderate power consumption (Column 1 lines 10-16).

Kajii et al. do not disclose the pressure of a chamber in communication with the quenching nozzles.

Aratani et al. disclose a method of tempering glass sheet where at the start of quenching a source of compressed air in communication with air chambers from which nozzles protrude is kept at a predetermined first pressure in the range from 2 to 8 kg/cm^2 (Abstract). Note that this pressure range is equivalent to 0.2 to 0.8 MPa. The compressed air is stored in air tank 26 which communicates with air chamber 16 from which nozzles 20 protrude (see Figure). Aratani et al. further disclose that allowing the

air chambers from which the nozzles protrude to suddenly come into communication with a source of compressed air at the pressure range above results in air jets with very high kinetic energy and heat dissipating power at the initial stage of quenching (Abstract).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a tank of compressed air in the predetermined pressure range of 2 to 8 kg/cm^2 in communication with quenching nozzles as taught by Aratani et al. in Kajii et al.'s apparatus. The rationale to do so is provided by Aratani et al.'s teaching that allowing the air chambers from which the nozzles protrude to suddenly come into communication with a source of compressed air in the above stated pressure range predictably results in air jets with very high kinetic energy and heat dissipating power at the initial stage of quenching (Abstract).

15. **Regarding claim 3,** Kajii et al. and Hiroshi et al. disclose all the limitations of claim 1 (see 12 above).

Kajii et al. and Hiroshi et al. in further view of Nikander et al. and Aratani et al. do not explicitly disclose the adjustment of nozzle diameter, distance between the nozzles and glass and chamber pressure such that the heat flux difference within a glass surface is 150 kW/m^2 or less.

Since Kajii et al., Hiroshi et al., Nikander et al. and Aratani et al. combine to teach the same materials being treated in the same manner as instantly claimed, one of ordinary skill in the art at the time the invention was made would have expected the

heat flux difference within the glass surface to intrinsically be the same as instantly claimed.

16. **Regarding claim 4,** Kajii et al. and Hiroshi et al. disclose all the limitations of claim 1 (see 12 above).

Kajii et al. and Hiroshi et al. in further view of Nikander et al. and Aratani et al. do not explicitly disclose the adjustment of nozzle diameter, distance between the nozzles and glass and chamber pressure such that the difference of surface compressive stress values of the thermally tempered glass is 20 MPa or less.

Since Kajii et al., Hiroshi et al., Nikander et al. and Aratani et al. combine to teach the same materials being treated in the same manner as instantly claimed, one of ordinary skill in the art at the time the invention was made would have expected the difference of surface compressive stress values of the thermally tempered glass to intrinsically be the same as instantly claimed.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art discloses the tempering of glass using two types of quenching nozzles having different diameters: US Patent 3,393,062, US Patent 5,094,678 and US Patent 4,323, 385.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON KANE whose telephone number is (571)270-7659. The examiner can normally be reached on M-R 6:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571)272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JASON KANE/
Examiner, Art Unit 4122

/Timothy J. Kugel/
Primary Examiner, Art Unit 1796